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18. STUDIES ON THE LIMESTONE VEGETATION OF SAHASRADHARA NEAR DEHRA DUN (U.P.)—4 'INDICATOR VALUE OF PLANTS'

The probable plant indicators for the mineral calcium have been discussed in this paper.

The studies on the limestone vegetation of Sahasradhara area have revealed certain facts regarding the calcicole and calcifuge plants. Chibber (1945) stated that the rain water charged with carbon dioxide dissolves the limestone rocks and thus the hollows, caves and caverns are formed. Such caves with stalactites and stalagmites are observed along the rocks opposite to the sulphur spring. The soil in these places is calcareous and it is covered with a carpet of plants which include *Adiantum capillus-veneris* Linn., *Pogonatherum paniceum* (Lamk.) Hack., *Primula floribunda* Linn. etc.

According to Puri (1950) 'on new soils e.g., river gravels, shingle islands, or boulder bed, or those which are topographically immature and contain high amount of calcium carbonate (steep slopes and scrap face etc.). Sal community is not present though a solitary tree may be found locally in pockets of mature soils'.

In the present study, the soil samples analysed from the eastern slope, where *Shorea robusta* Gaertn. dominates, are acidic. This is clear from the following data :

Calcium carbonate	= 0.75-0.92%
Nitrogen	= 0.04134-0.04627%
pH	.. 6.1-6.3

Thus the present studies at Sahasradhara agree with those made by Puri (1950) showing clearly that *Shorea robusta* Gaertn. does not grow on alkaline soils.

The surface soils underneath herbs like *Campanula colorata* Wall. ex Roxb., *Eriophorum comosum* Wall. ex Nees and *Galium vestitum* D. Don from the rocky crevices were analysed and they were found to be alkaline. This is clear from the following data :—

Calcium carbonate	= 73.15-88.30 %
Nitrogen	= 0.01790-0.3591 %
pH	.. 8.3-8.4

This shows that these plants can grow on alkaline soils which possess a greater percentage of calcium carbonate. There are other calcicole plants collected from the rocky crevices namely *Cerbera gossypina* (Roxb.) Raizada and Saxena, *Herminium monophyllum* (D. Don) F. F. Hunt and Summerhayes, *Inula cuspidata* Clarke, *Origanum vulgare* Linn. etc. Further these plants are conspicuous by their complete absence from the eastern slope (*Shorea robusta* Gaertn. belt), which is acidic and deficient in calcium.

Thus the occurrence of *Adiantum capillus-veneris* Linn., *Campanula colorata* Wall. ex Roxb., *Eriophorum comosum* Wall. ex Nees, *Galium vestitum* D. Don, *Cerbera gossypina* (Roxb.) Raizada and Saxena, *Herminium monophyllum* (D. Don.) F. F. Hunt and Summerhayes, *Inula cuspidata* Clarke, *Origanum vulgare* Linn., and *Pogonatherum paniceum* (Lamk.) Hack. exclusively on calcium rich soils shows that they are indicators for the mineral calcium.

The following species have been collected exclusively from the calcareous soils and hence there is every possibility that these species are probable indicators for the mineral calcium *Arenaria serpyllifolia* Linn., *Argostemma verticillatum* Wall., *Begonia picta* Sm., *Bergenia ligulata* (Wall.) Engl. var. *ciliata* (Royle) Engl., *Corallodiscus langinosus* (Wall. ex DC.) B. L. Burt, *Galium aparine* Linn., *Lindenbergia macrostachya* Benth., *Taraxacum officinale* Weber, *Poa annua* Linn. and *Viola serpens* Wall. ex Roxb.

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19. *NICOTIANA GLAUCA* GRAHAM—A TREE TOBACCO IN MAHARASHTRA

In January 1971 I was informed that there are some plants called in Marathi as 'Mahapurusha' or 'Mahasatpurusha' growing at Kundlapur (Sangli district) whose leaves when chewed produce a sort of hallucination or trance effect and are often used locally for various pulmonary disorders. Subsequently, I visited the locality to collect flowering and fruiting specimens and found that the species belonged to the genus *Nicotiana*. The species identification could not be confirmed since the characters did not tally with any of the four species of *Nicotiana* found under cultivation or as exotics in India (Haines 1922; Patel 1960). Some of the herbarium specimens along with my notes were sent to Royal Botanical Gardens, Kew, England, where they have been identified as belonging to *Nicotiana glauca* Graham.

The species has so far been collected by me from Kundlapur and Jarandi of Kavathe Mahankal Taluka of Sangli District. The plants grow wild about these villages. They do not however form a part of the natural vegetation. Inquiry with the local people revealed that the plants have grown in the area for the last 35-40 years though their importance has been realized only quite recently.

Nicotiana glauca belongs to the subgenus *Rustica*, section *Paniculatae* and occurs in Argentina, Mexico and parts of North America (Good-speed 1954). Its occurrence in India has not been reported so far and hence a brief description of the species and a key to separating it from other species of *Nicotiana* found in India has been given below.

Nicotiana glauca Graham. A perennial shrub reaching 3 m height. Leaves alternate, petiole 2.5-3.5 cm long, lamina 7-4.5 cm long, 3.5-2.3 cm broad in the middle, margin entire, acute-acuminate, main nerves 6-10 pairs; lower leaves much larger. Inflorescence terminal